

## **SPACE-TIME CODING FOR MULTI-ANTENNA ULTRA-WIDEBAND TRANSMISSIONS**

### **ABSTRACT**

Space-time (ST) coding techniques are described for multi-antenna transmissions in ultra-wideband (UWB) communication systems. The ST coding schemes may, therefore, be tailored for dense multipath channels. The techniques may be applied with linear and nonlinear modulation, coherent and noncoherent reception, and block interleaving of symbols. An UWB communication system is described that includes an ST encoder at the transmitter, multiple transmit and receive antennas, and two-step maximum ratio combining (MRC) at the receiver. The two-step MRC enables the receiver to collect full spatial and multipath diversity from a transmission. Two coding schemes for an UWB system with two transmit antennas and one receive antenna are described. Multiple antenna transmissions of ST encoded symbols increase the amount of diversity a receiver is able to collect without increasing the complexity of the receiver.